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Circuit Analysis and Electronic Device

Unit 1

1. Write Binary number's corresponding to following decimal number : (a) 786 (b) 121 **[2013]**
2. Convert decimal number 110 to its binary equivalent. **[2013]**
3. Convert A9B5.49 hexadecimal number to its equivalent decimal number. **[2013]**
4. Write hexadecimal equivalent for 5076 decimal. **[2013]**
5. What is the value of one byte in bit form? **[2013]**
6. Add 1101 and 0011. **[2013]**
7. Multiply 1100 with 0101. **[2013]**
8. Convert 0.95 to its binary equivalent. **[2013]**
9. Convert the following binary number into its octal equivalent: $(1001011.10101)_2 = (?)_{10}$ **[2014]**
10. Add 1011 and 110 **[2014]**
11. Divide the binary number 1110101 by 1001 **[2014]**
12. Perform the following conversion and find X : **[2014]**
    $(4057.06)_8 = (X)_{10}$
13. Convert $(564)_{10}$ into its hexadecimal equivalent. **[2014]**
14. Convert $(DBCA)_{16}$ into its decimal equivalent. **[2014]**
15. Perform the following conversion and find X : **[2015]**
    $(23043)_8 = (X)_{16}$
16. Add 11001 and 1010 **[2015]**
17. Subtract 101 and 100101 **[2015]**
18. Convert $(11001)2$ into $(X)8$, find X. **[2015]**
19. Convert $(59.4375)_{10}$ into binary. **[2016]**
20. Subtract $(01111)_2$ from $(11011)_2$ **[2016]**
21. Divide 100011 by 111. **[2016]**
22. Perform the following number system conversions: **[2017]**
    a. $(110110111)_2 = (?)_{10}$ Convert to decimal
    b. $(5674)_{10} = (?)_2$ Covert to binary
23. What is Binary coded decimal code? **[2017]**
24. Describe ASCII and elaborate its importance. **[2017]**
25. Convert the following from octal to decimal: **[2017]**
    a. $(33.56)_8 = (?)_{10}$
    b. $(331)_8 = (?)_{10}$
26. Discuss in detail the concept of number systems viz, binary, decimal, octal and hexadecimal. Describe the process steps of interconversion from one number system to other. **[2017]**
27. Define coding of information and its need/use. Describe briefly the binary coded decimal codes. Prove that Grey code is both reflective and unit distance code?

    [2017]
28. Describe various codes. **[2015][2016]**
29. What are the advantages of using different number systems? **[2017]**

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Unit 2

1. Describe the operating characteristics of BJT. **[2013]**
2. Explain the switching action of Bipolar Junction transistor. **[2013]**
3. Write short notes on the following : **[2014]**
   a. RTL   b. TTL
4. Draw TTL circuit diagram of OR gate. **[2015]**
5. What is the difference between Analog signal and Digital signal? **[2015]**
6. Explain operation of AND gate with TTL logic circuit. **[2015]**
7. Give switching characteristics of semiconductor diode. **[2016][2017]**
8. Describe operation of OR gate with TTL circuit. **[2016]**
9. Draw symbol of NPN transistor. **[2015]**
10. Write two characteristics of digital IC. **[2015]**
11. Explain switching characteristics of transistor. **[2015]**
12. What is active high signal? **[2015]**
13. Give logic families and their characteristics. **[2016]**
14. Characteristics of Digital IC's **[2017][2013]**

Unit 3

1. Write truth table for XNOR gate. **[2013][2017]**
2. Write the truth table for the following logic circuit: **[2013]**
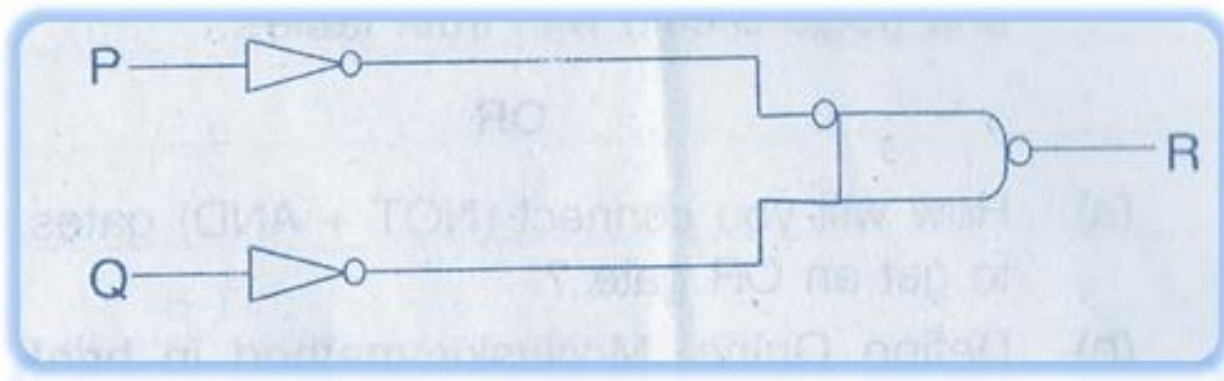
3. Give truth table of Universal gate. **[2013]**
4. Write basic rules for NAND gate. **[2013]**
5. Draw logic circuit which represents the Boolean equation : **[2013]**
   $Y = (\overline{A}B + A\overline{B}) . \overline{C}$
6. Define Half Adder. **[2013][2016][2017]**
7. Describe Full Adder with its logic diagram and truth table. **[2013][2016][2017]**
8. How will you connect (NOT + AND) gates to get an OR gate. **[2013]**
9. Describe DEMUX and also draw its circuit diagram. **[2013][2016]**
10. Minimize the following Boolean expression using K-Map : **[2014]**

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$$F(A,B,C,D) = \sum_m (0,4,6,7,8,9,10,13)$$

11. Define multiplexer. **[2014][2016][2017]**
12. Write the truth table of XOR gate **[2014]**
13. What is SOP form? **[2014]**
14. Simplify y=AB+AB′ **[2014]**
15. What do you mean by Universal gate? **[2014]**
16. Minimize the following Boolean expression using K-Map : **[2014]**

$$F(A,B,C,D) = \sum_m (0,4,6,7,8,9,10,13)$$

17. Explain full adder with its truth table. Design a half adder using NAND gates only. **[2014]**
18. What is Boolean algebra? Explain it's all laws and solve the problem : **[2014]**

$$AB + \overline{C}(AB + A\overline{C})'$$

19. Write truth table of NAND gate. **[2015]**
20. Simplify : **[2015]**

$$(A\overline{B} + \overline{A}B)'$$

21. Prove that A(A+B)=A **[2015]**
22. Prove that : **[2015]**

$$ABC + A\overline{B}C + AB\overline{C} = A(B + C)$$

23. Explain Adders **[2015]**
24. Explain working of MUX. **[2015][2016]**
25. What are various code converters? **[2015]**
26. Describe various reduction techniques with examples. **[2015]**
27. Describe half subtractor. **[2015]**
28. Write truth table of NAND gate. **[2016]**
29. Show that A(A-B)=A **[2016]**
30. Get OR gate function (operation) by NAND gate. **[2016]**
31. What is Decoder? **[2015][2016]**
32. What is 2 bit by 2 bit multiplier? **[2016]**
33. Describe Quine-McCluskey method for reducing Boolean function to a minimal form. **[2013][2014][2016]**
34. Obtain AND,OR,NOT gate functions(operation) from NOR gate. **[2016]**
35. Simplify the following expression: **[2016]**

$$ABC + A\overline{B}(\overline{\overline{AC}})$$

36. What is Boolean algebra? Give example of devices with 2 states. **[2017]**
37. Write the truth table of NOR gate. **[2017]**

38. What is DeMorgan's law?   **[2017]**
39. What is a truth table? Draw and describe And, OR and NOT gates.   **[2017]**
40. What is Karnaugh Map (K-Map)   **[2017]**
41. What do you understand by logic functions? Illustrate by describing any one logic function as an algebraic function, truth table and logic circuit.   **[2017]**
42. Describe Quine McCluskey method of minimization and its key principles   **[2017]**

Unit 4

1.   Describe SR flip flop with its block symbol and truth table and also explain T flip flop.   **[2013]**
2.   Explain T flip flop with truth table.   **[2014][2015]**
3.   What is race around condition?   **[2014]**
4.   Explain Master slave JK flip flop with circuit diagram in detail   **[2014][2016]**
5.   What is sequential circuit?   **[2014]**
6.   What is race around condition?   **[2014]**
7.   Explain synchronous and asynchronous counters with circuit diagrams   **[2014]**
8.   Give block diagram of JK flip flop and explain its working.   **[2015][2017]**
9.   What are registers?   **[2013][2015][2016][2017]**
10. Give block diagram of RS flip flop.   **[2016]**
11. Discuss the concept and usage of sequential circuits.   **[2017]**